

**Meeting of the Central Valley Flood Protection Board
December 3, 2010**

**Staff Report
Tulare County Resource Management Agency
Avenue 416 Bridge; Kings River, City of Dinuba**

1.0 – ITEM

Consider approval of Permit No. 18636 (Attachment B, Exhibit A).
Bridge #46C0027.

2.0 – APPLICANT

Tulare County Resource Management Agency

3.0 – LOCATION

The project is located west of the city of Dinuba on Avenue 416, California.
(Kings River, Tulare County, see Attachment A).

4.0 – DESCRIPTION

To remove existing bridge and construct a new 81-foot-wide, 740-foot-long, 4-lane cast in-place prestressed concrete box girder bridge across the Kings River, supported by four piers within the channel (four 5-foot-diameter columns each), and two short-seat-type abutments supported by driven pile foundations on the top of each river bank; construct temporary fill access ramps, temporary river crossing, and false work; place approximately 2,000 CY of rock riprap and 600 CY of earthen fill within the channel; and remove the existing 2-lane bridge entirely. See also 5.6 – Utility Relocations.

5.0 – PROJECT SPECIFICS

The existing Avenue 416 Kings River Bridge is proposed to be replaced as part of the Avenue 416 widening project. The existing bridge was constructed in 1948 and carries two lanes of traffic over the King's river. The span bridge consists of four cast-in-place concrete haunched girders with internal concrete decking, and is supported on twenty-two pier wall type bents. The existing bridge measures 31.5 feet wide and is 850 feet long with nineteen 40-foot interior spans. The existing bridge is considered functionally obsolete due to its insufficient deck geometry. The current geometry provides 1-foot shoulders in each travel direction, which does not satisfy the American Association of State Highway and Transportation Officials' (AASHTO's) standards for a rural arterial. Additionally, according to analyses by Quincy Engineering, Inc., in 2002, the existing bridge has several seismic deficiencies including insufficient hinge seat widths and shear failure of the piles.

The new bridge will measure 81 feet wide and 740 feet long and span over the 100-year high-water elevation (298.7 feet) with 3 feet of freeboard per Title -23. Four piers and two abutments will support the proposed bridge superstructure to be cast-in-place. Each pier will consist of four 5'-0" diameter columns. Each column will extend below the ground and be supported on a 6'-0" diameter cast-in-drilled-hole (CIDH) or cast-in-steel-shell (CISS) pile. The piers would be skewed at 22 degrees to align with the direction of the channel flow and improve scour conditions. The bridge abutments would be constructed on drilled pile/ pile cap foundations and sit at the top of each river bank. Driven piles, maybe acceptable along the stream banks, if proven safe to do so with no damage to the banks. Rock slope protection will be placed on the stream bank below each abutment.

This project is located on the King's River which is a Regulated Stream as defined by Title-23, Table 8.1 and within the Central Valley flood Protection Board's Designated Floodway.

5.1 – Hydraulic Summary

The project described in Section 5.0 is located in a Designated Floodway west of the City of Dinuba on Highway 416, California. The King's River flows southwesterly through the northern part of Tulare County which drains an approximately 1,800-square mile watershed at the bridge. Pine Flat dam located 31 miles upstream of the bridge site impounds 1,545-square miles of the watershed. The discharge used for the bridge hydraulic analysis is shown below:

	Design	Flood of Record	Base	Overtopping Flood
Frequency (Years)	50		100	>500
Discharge (CFS)	15,000	17,100	20,500	>49,200
Water Surface Elev.	296.9	297.5	298.7	>308.0
@ u/s face of Bridge				
W.S.E. @ Soffit C.L.	303.05	303.05	303.05	
Freeboard (Ft.)	6.15	5.55	4.35	

A HEC-RAS one dimensional hydraulic model was prepared by Avila and Associates Consulting Engineers Inc. (dated September 20, 2010) with a 100-year design storm used to determine the hydraulic effects of the project. This water surface elevation at the upstream face of the bridge has a slight decrease in hydraulic impacts associated with the above construction as compared to the existing conditions. The 0.02-ft. decrease (1/4 inch) for the 100-year discharge is due to the reduction of piers in the floodway.

According to Title 23, Section 128(10)(A), the freeboard above the design flood plane is greater than 3-feet, thus the project is in compliance with Title 23 Standards.

The 100-year velocity is 4 feet per second based on mannings roughness (“n”-value) of 0.03 for the Thalweg and 0.06 along the left and right side of the river.

The applicant has no plans to prepare a Long Term Maintenance Plan for the vegetation but they do have a five year maintenance and establishment plan. The higher mannings “n” values utilized in the hydraulic model should account for long term grow-out of the vegetation. Those values are documented in the Design Hydraulic Study Report for the Avenue 416 Bridge dated September 20, 2010 (page 15) and prepared by Avilia and Associates Consulting Engineers, Inc. (not included in this staff report).

5.2 – Survey Datum

The datum elevation used for this study was a local benchmark (MN69) tied into a benchmark close to the project at County Road 40. According to the surveyors, (Iley Ballinger, Tri City Engineering; e-mail dated March 22, 2010), the local datum is 0.829-ft. higher than NGVD-29. And the North American Datum (NAVD-88) is 2.6-ft. higher than NGVD-29.

Therefore, the local used datum is 1.77-ft. below NAVD-88 datum.

5.3 – Pier Scour

From the Pier Scour Equation (HEC-18) submitted by the applicant’s sub-consultant, we find that scour depths range from 8 to 10 feet deep (See Attachment F). From a bridge structural stand point, the piers have been designed so that the structural integrity of the bridge is sound. However, from a water quality stand point and a stream mechanics consideration downstream, there is a concern. The applicant is pursuing sediment transport calculations to disprove those concerns. Upon receipt and review of the calculations, board staff will consider whether pier scour protection is needed. Currently there is a condition in the proposed permit (Condition No. 37) to insure that pier scour is addressed through mitigation measures or calculation proof that outlines that scour protection is not needed for this project.

5.4 – Temporary Falsework Analysis of Hydraulics

Temporary Falsework is needed to support the new 81-foot-wide, 740-foot-long, 4-lane cast-in-place prestressed concrete box Girder Bridge across the Kings River along with two concrete abutments. Because of the prestressing element of the bridge deck, extra concrete cure time will be needed to allow concrete to reach the required strength need. Therefore, the falsework will need to stay in place longer than normal. The proposed section, analysis and water surface elevation can be viewed as Attachment E.

However, the final falsework design will be provided by the contractors engineer after the award of contract. Permit Conditions 26 and 27 states that the final falsework

design will be reviewed and approved by Board staff prior to construction and that the applicant will need to get a Board time variance to leave the falsework in the regulated stream during the winter shut down.

Attachment E shows a proposed water surface profile with the falsework in place and also considers the debris load. The rise in water surface elevation is 0.1 feet above the proposed water surface without the falsework. Therefore, there may not be a problem if the contractor's falsework plan is consistent with the designer's transverse bracing idea.

5.5 – Geotechnical Summary

This project will not have a major impact on the existing stream banks and have no impacts to the integrity of the Flood Control System. Excavation within the floodway occurs at locations that are not critical to the integrity of the natural stream bank or channel. All fill, rock placement, excavation, and temporary structures will be completed in compliance with Permit No. 18636 (see Attachment B) and Title 23.

5.6 – Utility Relocations

There will be 8 utility conduits that are proposed to cross the new bridge:

3 each; AT&T telephone and fiber optic four-inch diameter conduits.
Contact, Tim Smith (209)726-9620 at TS2612@ATT.com.

1 each; Verizon fiber Optic four-inch.
Contact, Greg Mayberry (559) 637-0667 at Gmayberry@wellscoinc.com.

2 each; PG&E primary electric six-inch diameter conduits.
Contact, Norm Bowlen (559) 263-5616 at NBB1@PGE.com.

4 each; Southern California Gas four-inch diameter gas carrier.
Contact, Beth Costa (559) 739-2319 at Bcosta@semprautilities.com

1 each; Time Warner Fiber Optic, ten-inch diameter conduit.
Contact, Jason Snead (559) 896-6690 at Jsnead@GSUC.net

5.7 – Staff Comments

This area is designated as rural farmland according to the Tulare County General Plan and Fresno County Public Works Department notes (in the Design Hydraulic Study Report for the Avenue 416 bridge dated September 20, 2010 (page 24) that "... a spike in development and population is not anticipated". So the area in and around the Avenue 414 Bridge are projected to remain as rural farm land and should have little effect on the surrounding area.

6.0 – AGENCY COMMENTS AND ENDORSEMENTS:

The comments and endorsements associated with this project, from all pertinent agencies are shown below:

- The U.S. Army Corps of Engineers 208.10 comment letter has not yet been received for this application. Upon receipt of a favorable letter and review by Board staff it will be incorporated into the permit as Attachment B, Exhibit A.

7.0 – PROPOSED CEQA FINDINGS:

Board staff has prepared the following CEQA Findings:

The Board, acting as a responsible agency under CEQA, has independently reviewed the Draft Environmental Impact Report/Draft Environmental Assessment (DEIR/EA) (SCH 2004111084 May 2008) and Final Environmental Impact Report/Final Environmental Assessment (FEIR/EA SCH 2004111084 October 2008) for the Mountain View Avenue/Avenue 416/El Monte Way Widening submitted by the County of Tulare. The County of Tulare, as the lead agency, determined that the project would have a significant effect on the environment as adopted by County of Tulare October 21, 2008 Resolution and Notice of Determination dated November 10, 2008 (which includes a Statement of Facts, Findings, and Mitigation Measures, Statement of Overriding Considerations, and Mitigation Monitoring and Reporting Program). These documents including project design and County of Tulare resolutions may be viewed or downloaded from the Central Valley Flood Protection Board website at <http://www.cvfpb.ca.gov/meetings/2010/12-03-2010.cfm> under a link for this agenda item. The documents are also available for review in hard copy at the Board and County of Tulare offices.

7.1 – Impacts that can be Mitigated

The significant impacts and the mitigation measures to reduce them to less than significant are adopted in County of Tulare October 21, 2008 Resolution (which includes a Statement of Facts, Findings, Impacts and Mitigation Measures, Statement of Overriding Considerations and Mitigation Monitoring and Reporting Program). Based on its independent review of the DEIR/EA and FEIR/EA and County of Tulare October 21, 2008 Resolution, the Board finds that for each of the significant impacts described, changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effects as identified in the DEIR/EA and FEIR/EA. Moreover, such changes or alterations are within the responsibility and jurisdiction of the County of Tulare and such changes have been adopted by that agency. The following are the significant impacts and the mitigation measures to reduce them to less than significant:

- Impacts to parkland. This impact can be mitigated by acquiring landscaped open space adjacent to the acquired parkland or other areas within the project area.
- Impacts to farmland. This impact can be mitigated by returning all unused farmland to farming operations, maintaining access to existing farmlands, and designing and constructing the project to minimize impacts to farm operations.
- Displacement and/or relocation of existing housing and other structures. This impact can be mitigated by providing relocation assistance and/or compensation to displaced residents, businesses, and institutions.
- Impacts to visual resources. This impact can be mitigated by compensation to property owners for the loss of privately owned landscaping, replacement of vegetation disturbed by construction on the Kings River Bridge in accordance with the Habitat Restoration Plan, and landscaping of the areas disturbed within the City of Dinuba in accordance with a landscaping plan.
- Impacts to Architectural and Historic Resources. This impact can be partially mitigated by documentation of the architectural structures, replacement of historical vegetation disturbed by construction with similar vegetation, and/or preparation of materials describing the historic significance of the resource impacted by the project.
- Impacts to unknown and undiscovered archaeological resources. These impacts can be mitigated by stopping work in the area of the find and contacting the appropriate persons if cultural resources are discovered during excavation.
- Construction-related water quality impacts due to erosion. These impacts can be mitigated by identifying construction related best management practices in the construction plans and implementing them during construction and adherence to the State Standard Specifications for avoidance of water pollution.
- Potential exposure of previously known and unknown hazardous wastes to construction workers and/or nearby land uses. This impact can be mitigated by screening surface soils for residual chemicals, determining the location and status of underground storage tanks, testing existing paint and preparing a health and safety plan, monitoring groundwater levels, testing for asbestos containing materials and investigation of agricultural land for toxic chemicals.
- Temporary increase in dust emissions during grading and construction activities. This impact can be mitigated by implementing dust stabilizers and adhering to related best management practices.

- Possible Permanent loss of Willow Riparian Woodland. This possible impact can be mitigated by preparation of a Habitat Restoration Plan, and/or the purchase of riparian mitigation credits from a regional mitigation bank.
- Impacts to wetlands and other waters of the United States. This impact can be mitigated by protecting water quality and preventing erosion in drainages and waterways, implementation of a wetland restoration/compensation plan, establishing an environmentally sensitive area to limit work near the Kings River willow riparian habitat, and purchasing credits in a regional mitigation bank for riparian wetland compensation.
- Impacts to special-status plant species. This impact can be mitigated by relocation of observed special plant species to newly established locations within the project area.
- Impacts on roosting habitats for bats. These impacts can be mitigated by conducting preconstruction surveys for bat roosts, implementing bat protection measures, and compensating for loss of bat habitat by providing suitable habitat to accommodate the existing bat colony.
- Impacts on Western Pond Turtle. These impacts can be mitigated by conducting preconstruction surveys and relocating the turtle to an appropriate habitat, if necessary.
- Impacts on nesting habitat for Western Burrowing Owl. These impacts can be mitigated by conducting preconstruction surveys for Western Burrowing Owl burrows and implementing CDFG guidelines for Western Burrowing Owl mitigation, if necessary.
- Impacts on nesting Cooper's Hawks, White-Tailed Kites, and other migratory birds. These impacts can be mitigated by conducting preconstruction nesting bird and raptor surveys and establishing a no-disturbance buffer, if necessary.
- Impacts on active Swallow nests. These impacts can be mitigated by preventing swallows from nesting in the work area during construction.
- Direct and indirect effects on San Joaquin Kit Fox (SJKF). This impact can be mitigated by conducting preconstruction surveys prior to ground disturbance to search for SJKF presence in the project impact area, establishing and maintaining exclusion zones around SJKF dens, implementing SJKF contract special provisions to avoid and minimize temporary construction disturbance to SJKF.
- Impacts on nesting and foraging Swainson's Hawk. These impacts

can be mitigated by conducting preconstruction nesting bird and raptor surveys and establishing a no-disturbance buffer, if necessary.

- Impacts on Valley Elderberry Longhorn Beetle. These impacts can be mitigated by surveying project area for elderberry shrubs, establishing environmentally sensitive areas, conducting pre-construction training for all work crews, monitoring of the project site during construction, relocation of affected plants, and planting of elderberry seedlings to compensate for the loss of stems.
- Impacts from invasive plant species. These impacts can be mitigated by avoiding introduction of new weeds into the project area and removing invasive plant species from the project area.

7.2 – Significant Unavoidable Adverse Impacts of the Project

The following impacts of the proposed project remain significant following adoption and implementation of the mitigation measures described in the FEIR/EA:

- Cultural Resources - Acquisition and removal of the Levis House, McNab Residence, Wittington Residence and the Bolinger House.
- Noise Effect - Exposure of noise sensitive land uses to traffic noise.

The Board finds that the specific economic, legal, social, technological or other benefits of the project outweigh the unavoidable adverse environmental effects, which are thus considered to be “acceptable.”

7.3 – Statement of Overriding Considerations

The County of Tulare adopted Resolution October 21, 2008 including the Statement of Overriding Considerations. The Board concurs with this Statement. The Board has independently considered the significant and unavoidable environmental impacts of the proposed project. The Board finds that economic, legal, social, technological, or other benefits of the proposed project outweigh the unavoidable adverse environmental effects of the project, and the adverse environmental effects are considered acceptable when these benefits of the project are considered.

The documents and other materials which constitute the record of the Central Valley Flood Protection Board’s proceedings in this matter are in the custody of Jay Punia, Executive Officer, Central Valley Flood Protection Board, 3310 El Camino Ave., Rm. 151, Sacramento, California 95821.

8.0 – SECTION 8610.5 CONSIDERATIONS

1. Evidence that the Board admits into its record from any party, State or local public agency, or nongovernmental organization with expertise in flood or flood plain management:

The Board will make its decision based on the evidence in the permit application and attachments, this staff report, and any other evidence presented by any individual or group.

2. The best available science that related to the scientific issues presented by the executive officer, legal counsel, the Department or other parties that raise credible scientific issues.

The accepted industry standards for the work proposed under this permit as regulated by Title 23 have been applied to the review of this permit.

3. Effects of the decision on the entire State Plan of Flood Control:

This project has no negative impacts on the State Plan of Flood Control. Both hydraulic and structural impacts from the project construction are negligible.

4. Effects of reasonable projected future events, including, but not limited to, changes in hydrology, climate, and development within the applicable watershed:

Climate change issues have not been taken into account in the hydraulic analysis for this project; however, it is assumed to be inland past the point tidal influence raises in WSE, and due to the excessive amount of freeboard in the channel at this location, the project would have an ample factor of safety built into it. Climate change WSE raises are only estimated from 6-inches to 1-foot of impact and would be well within the freeboard of this project in the event that tidal influences did reach further inland than expected. There are no other foreseeable projected future events that would impact this project.

9.0 – STAFF RECOMMENDATION

Staff recommends that the Board adopt the CEQA findings, approve the permit conditioned upon receipt and review of a favorable U.S. Army Corps of Engineers 208.10 comment letter and direct staff to file a Notice of Determination with the State Clearinghouse.

10.0– LIST OF ATTACHMENTS

- A. Location Maps and Photo

- A. Draft Permit No. 18636
 - Exhibit-A; Corps of Engineers Letter
 - Exhibit-B; Kings River Conservation District conditions
- B. Drawings
 - Bridge Plan & Profile
 - Cross Section (new & old bridges)
 - Pile Layout
- C. Hydrology / Hydraulics
 - Water Surface Elevation.
 - Water Surface Profile U/S & D/S of bridge
 - HEC RAS X-Section
 - 100. discharge; existing & proposed W.S.
- D. Falsework
 - Configuration
 - Analysis
 - Raise in water surface + debris
- F. Pier scour calculations

Prepared by:	David R. Williams
Design Review:	David R. Williams
Environmental Review:	James Herota
Document Review:	Dan Fua
	Len Marino

DRAFT

The Tulare County Resource Management Agency proposes to replace the bridge with a new bridge crossing the Kings River using Highway Bridge Program (HBP) funding.

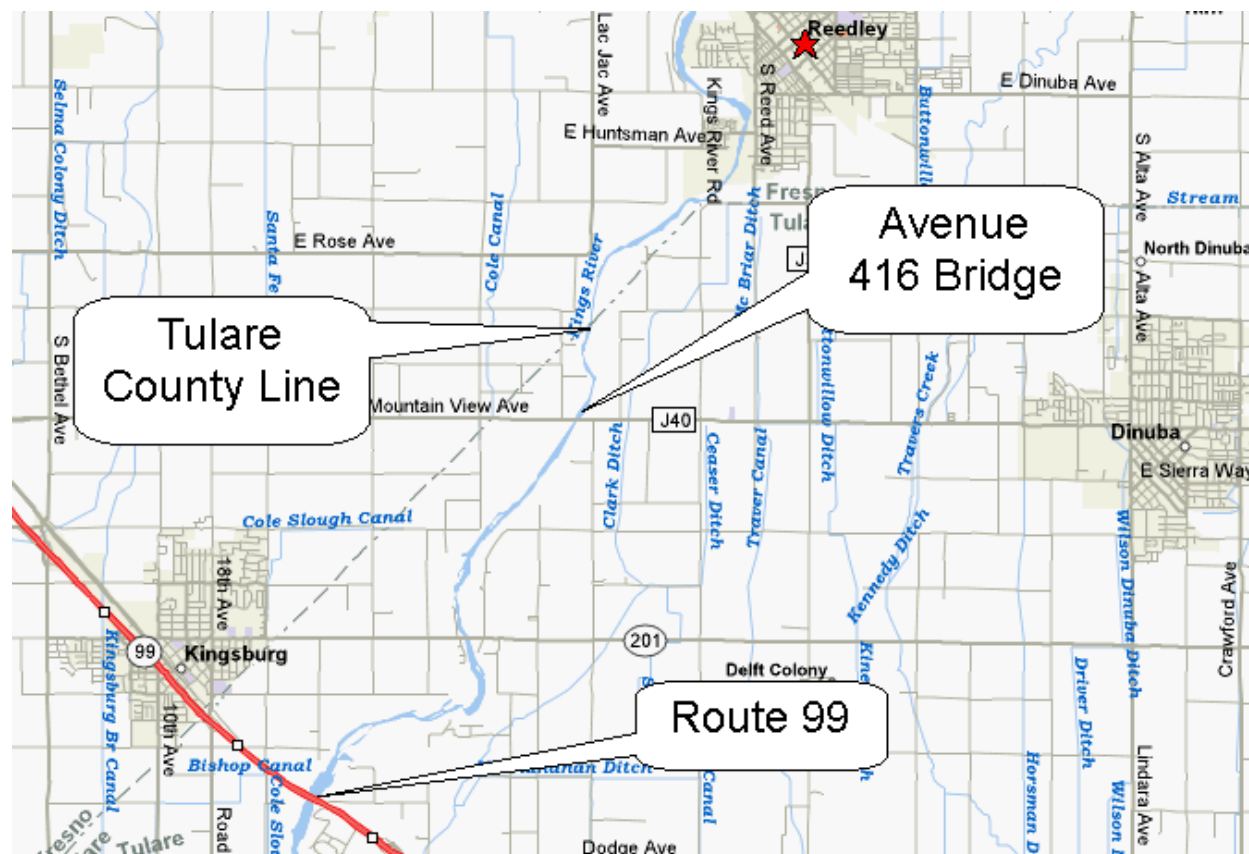


Figure 3: Bridge location map (from Mapquest.com)

The datum elevation used for this study was a local benchmark (MN69) tied into a benchmark close to the project at County Road 40. According to the surveyors, (Iley Ballinger, Tri City Engineering e-mail dated March 22, 2010), the local datum is 0.829-ft higher than NGVD-29 and the North American Vertical Datum of 1988 (NAVD-88) is 2.6-ft higher than NGVD-29. Therefore, the NAVD-88 is 1.77-ft above the local datum.

The proposed bridge will be 5-span cast-in-place reinforced concrete box girder bridge which will be 750-feet long, and the full deck width of 80-ft 10-inches and will accommodate 4 travel lanes with shoulders as shown in the attached General Plan (Appendix A).

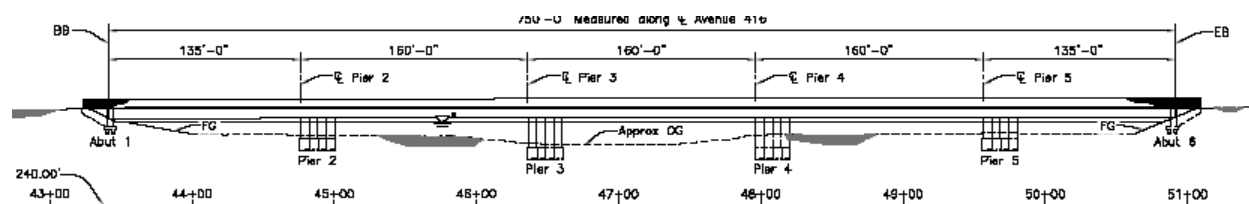


Figure 4: Proposed bridge profile view



DESIGN HYDRAULIC STUDY

KINGS RIVER BRIDGE AT AVENUE 416

Bridge Number 46C0027

TULARE COUNTY, CALIFORNIA

Draft

DRAFT

STATE OF CALIFORNIA
THE RESOURCES AGENCY
THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18636 BD

This Permit is issued to:

Tulare County Resource Management Agency
5961 South Mooney Boulevard
Visalia, California 93277

To remove existing bridge and construct a new 81-foot-wide, 740-foot-long, 4-lane cast -in-place pre-stressed concrete box girder bridge supported by four bents (four 5-foot-diameter piers each) and two short-set-type abutments supported by pile driven foundations across the channel and within the Designated Floodway; and place approximately 2,000 cubic yards of rock riprap and 600 cubic yards of earthen fill within the channel; complete utility work; and remove the existing 2-lane bridge entirely, within the Kings River. The project is located west of the City of Dinuba on Avenue 416 (Section 9, T16S, R23E, MDB&M, Kings River Conservation District, Kings River, Tulare County).

NOTE: Special Conditions have been incorporated herein which may place limitations on and/or require modification of your proposed project as described above.

(SEAL)

Dated: _____

Executive Officer

GENERAL CONDITIONS:

ONE: This permit is issued under the provisions of Sections 8700 – 8723 of the Water Code.

TWO: Only work described in the subject application is authorized hereby.

THREE: This permit does not grant a right to use or construct works on land owned by the Sacramento and San Joaquin Drainage District or on any other land.

FOUR: The approved work shall be accomplished under the direction and supervision of the State Department of Water Resources, and the permittee shall conform to all requirements of the Department and The Central Valley Flood Protection Board.

FIVE: Unless the work herein contemplated shall have been commenced within one year after issuance of this permit, the Board reserves the right to change any conditions in this permit as may be consistent with current flood control standards and policies of The Central Valley Flood Protection Board.

SIX: This permit shall remain in effect until revoked. In the event any conditions in this permit are not complied with, it may be revoked on 15 days' notice.

SEVEN: It is understood and agreed to by the permittee that the start of any work under this permit shall constitute an acceptance of the conditions in this permit and an agreement to perform work in accordance therewith.

EIGHT: This permit does not establish any precedent with respect to any other application received by The Central Valley Flood Protection Board.

NINE: The permittee shall, when required by law, secure the written order or consent from all other public agencies having jurisdiction.

TEN: The permittee is responsible for all personal liability and property damage which may arise out of failure on the permittee's part to perform the obligations under this permit. If any claim of liability is made against the State of California, or any departments thereof, the United States of America, a local district or other maintaining agencies and the officers, agents or employees thereof, the permittee shall defend and shall hold each of them harmless from each claim.

ELEVEN: The permittee shall exercise reasonable care to operate and maintain any work authorized herein to preclude injury to or damage to any works necessary to any plan of flood control adopted by the Board or the Legislature, or interfere with the successful execution, functioning or operation of any plan of flood control adopted by the Board or the Legislature.

TWELVE: Should any of the work not conform to the conditions of this permit, the permittee, upon order of The Central Valley Flood Protection Board, shall in the manner prescribed by the Board be responsible for the cost and expense to remove, alter, relocate, or reconstruct all or any part of the work herein approved.

SPECIAL CONDITIONS FOR PERMIT NO. 18636 BD

THIRTEEN: All work approved by this permit shall be in accordance with the submitted drawings and specifications except as modified by special permit conditions herein. No further work, other than that approved by this permit, shall be done in the area without prior approval of the Central Valley Flood Protection Board.

FOURTEEN: All utilities shall be constructed in accordance with Title 23 and the Approved Utility Plans, attached to this permit as Exhibit A and is incorporated by reference.

FIFTEEN: The mitigation measures approved by the CEQA lead agency and the permittee are found in its Mitigation and Monitoring Reporting Program (MMRP) adopted by the CEQA lead agency. The permittee shall implement all such mitigation measures.

SIXTEEN: The permittee shall defend, indemnify, and hold the Central Valley Flood Protection Board and the State of California, including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages related to the Central Valley Flood Protection Board's approval of this permit, including but not limited to claims filed pursuant to the California Environmental Quality Act. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

SEVENTEEN: The permittee is responsible for all liability associated with construction, operation, and maintenance of the permitted facilities and shall defend, indemnify, and hold the Central Valley Flood Protection Board and the State of California; including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively,

the "State"), safe and harmless, of and from all claims and damages arising from the project undertaken pursuant to this permit, all to the extent allowed by law. The State expressly reserves the right to supplement or take over its defense, in its sole discretion

EIGHTEEN: The Central Valley Flood Protection Board and the Department of Water Resources shall not be held liable for damages to the permitted encroachment(s) resulting from releases of water from reservoirs, flood fight, operation, maintenance, inspection, or emergency repair.

NINETEEN: The permittee shall be responsible for repair of any damages to the project levee and other flood control facilities due to construction, operation, or maintenance of the proposed project.

TWENTY: No construction work of any kind shall be done during the flood season from November 1 to July 15 without prior approval of the Central Valley Flood Protection Board.

TWENTY-ONE: The permittee shall provide supervision and inspection services acceptable to the Central Valley Flood Protection Board. A professional engineer registered in the State of California shall certify that all work was inspected and performed in accordance with submitted drawings, specifications, and permit conditions.

TWENTY-TWO: Prior to commencement of excavation, the permittee shall create a photo record, including associated descriptions, of the levee conditions. The photo record shall be certified (signed and stamped) by a licensed land surveyor or professional engineer registered in the State of California and submitted to the Central Valley Flood Protection Board within 30 days of beginning the project.

TWENTY-THREE: The permittee shall contact the Department of Water Resources by telephone, (916) 574-0609, and submit the enclosed postcard to schedule a preconstruction conference. Failure to do so at least 10 working days prior to start of work may result in delay of the project.

TWENTY-FOUR: The work area shall be restored to the condition that existed prior to start of work.

TWENTY-FIVE: The soffit of the bridge shall be no lower than that specified in Title 23.

TWENTY-SIX: Temporary staging, formwork, stockpiled material, equipment, and temporary buildings shall not remain in the floodway during the flood season from November 1 to July 15.

TWENTY-SEVEN: Bridge falsework plans shall be submitted to, and approved by Board staff, prior to construction, and the falsework shall be constructed in a manner that will not obstruct flows during the flood season.

TWENTY-EIGHT: The abandoned or dismantled bridge shall be completely removed and disposed of outside the limits of the levee section and floodway.

TWENTY-NINE: Fill material shall be placed only within the area indicated on the approved plans.

THIRTY: Backfill material for excavations shall be placed in 4- to 6-inch layers and compacted to at least the density of the adjacent, firm, undisturbed material.

THIRTY-ONE: Piers, bents, and abutments being dismantled shall be removed to at least 1 foot below the natural ground line and at least 3 feet below the bottom of the low-water channel.

THIRTY-TWO: Density tests by a certified materials laboratory will be required to verify compaction of backfill within the floodway.

THIRTY-THREE: No wild rose, grape, blackberries, or other bushy thickets shall be propagated or otherwise allowed to grow at this site. Permittee shall promptly remove such vegetation.

THIRTY-FOUR: The ground surface shall be kept clear of fallen trees, branches, and debris.

THIRTY-FIVE: All debris generated by this project shall be disposed of outside the floodway.

THIRTY-SIX: After each period of high water, debris that accumulates at the site shall be completely removed from the floodway.

THIRTY-SEVEN: Pier scour will be addressed through mitigation measures acceptable to the Central Valley Flood Protection Board staff, prior to construction.

THIRTY-EIGHT: Tree rows shall be parallel to the direction of the overbank flow and shall not direct the flows toward any levee. The minimum row spacing shall be 16 feet and the minimum spacing of trees within a row shall be 8 feet.

THIRTY-NINE: The Central Valley Flood Protection Board may require clearing and/or pruning of trees planted within the floodway in order to minimize obstruction to floodflows.

FORTY: Cleared trees and brush (or prunings therefrom) shall be completely burned or removed from the floodway, and downed trees or brush shall not remain in the floodway during the flood season from November 1 to July 15.

FORTY-ONE: Areas where plantings are lost to erosion shall not be replanted.

FORTY-TWO: The landscaping, appurtenances, and maintenance practices shall conform to standards contained in Section 131 of the Central Valley Flood Protection Board's Regulations.

FORTY-THREE: Any vegetative material, living or dead, that interferes with the successful execution, functioning, maintenance, or operation of the adopted plan of flood control must be removed by the permittee at permittee's expense upon request by the Central Valley Flood Protection Board, Department of Water Resources, or local maintaining agency. If the permittee does not remove such vegetation or trees upon request, the Central Valley Flood Protection Board reserves the right to remove such at the permittee's expense.

FORTY-FOUR: The permittee shall submit as-built drawings to the Department of Water Resources' Flood Project Inspection Section upon completion of the project.

FORTY-FIVE: The permittee shall operate and maintain the permitted encroachment(s) and the project works within the utilized area in the manner required and as requested by an authorized representative of the Department of Water Resources, or any other agency responsible for

maintenance. Maintenance may include actions to preserve the integrity of the flood control system under emergency conditions. These actions will be taken at the sole expense of the permittee.

FORTY-SIX: In the event that levee or bank erosion injurious to the adopted plan of flood control occurs at or adjacent to the permitted encroachment(s), the permittee shall repair the eroded area and propose measures, to be approved by the Central Valley Flood Protection Board, to prevent further erosion.

FORTY-SEVEN: If the proposed project results in an adverse hydraulic impact, the permittee shall provide appropriate mitigation measures, to be approved by the Central Valley Flood Protection Board, prior to implementation of mitigation measures.

FORTY-EIGHT: The permitted encroachment(s) shall not interfere with operation and maintenance of the designated floodway. If the permitted encroachment(s) are determined by any agency responsible for operation or maintenance of the designated floodway to interfere, the permittee shall be required, at permittee's cost and expense, to modify or remove the permitted encroachment(s) under direction of the Central Valley Flood Protection Board or Department of Water Resources. If the permittee does not comply, the Central Valley Flood Protection Board may modify or remove the encroachment(s) at the permittee's expense.

FORTY-NINE: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted encroachment(s) if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with any present or future flood control plan or project or if damaged by any cause. If the permittee does not comply, the Central Valley Flood Protection Board may remove the encroachment(s) at the permittee's expense.

FIFTY: If the project, or any portion thereof, is to be abandoned in the future, the permittee or successor shall abandon the project under direction of the Central Valley Flood Protection Board and Department of Water Resources, at the permittee's or successor's cost and expense.

FIFTY-ONE: The permittee should contact the U.S. Army Corps of Engineers, Sacramento District, Regulatory Branch, 1325 J Street, Sacramento, California 95814, telephone (916) 557-5250, as compliance with Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act may be required.

FIFTY-TWO: The permittee shall comply with all conditions set forth in the letter from the U.S. Army Corps of Engineers dated XXXXXX, which is attached to this permit as Exhibit B and is incorporated by reference.

FIFTY-THREE: The permittee shall comply with all conditions set forth in the letter from the Kings River Conservation District dated September 29, 2010, which is attached to this permit as Exhibit C and is incorporated by reference.

FIFTY-FOUR: This permit shall run with the land and all conditions are binding on permittee's successors and assigns.



4886 East Jensen Avenue
Fresno, California 93725

Tel: 559-237-5567

Fax: 559-237-5560

www.krcd.org

September 29, 2010

Mr. Mike Patterson
Central Valley Flood Protection Board
3310 El Camino Avenue, Suite LL40
Sacramento, California 95821

Re: Application (KRC D No. 800.05.247) Tulare County Resource Management
Agency, Avenue 416 Bridge Replacement Project

Dear Mr. Patterson:

Enclosed are four (4) copies of an encroachment permit application and accompanying data submitted by ICF International for the Tulare County Resource Management Agency. The project will remove the existing bridge across the channel of Kings River and replace it with a 81-foot-wide, 740-foot-long, 4-lane, cast-in-place prestressed concrete box girder bridge. The bridge will be supported by four piers within the channel (four 5-foot-diameter columns each), and two short-seat-type abutments supported by driven pile foundations on the top of each river bank. The project is located on Avenue 416, east of the City of Dinuba at 46.5 C.M., in Section 9, T.16S., R.23E., M.D.B. & M. in Tulare County.

The Kings River Conservation District (District) has no objection to the approval of this Application subject to the following conditions:

1. The applicant shall be responsible for the removal and clearance of all debris which lodges or collects against any portion of the bridge structure during periods of high water.
2. Temporary staging and form work allowed to remain in the floodway during the flood season (November 15th through July 20th) shall be subject to immediate removal upon notification by authorized representative of the District that flood-flows are imminent.
3. Cleared trees and brush shall be properly disposed outside the limits of the designated floodway.
4. In the event erosion of the banks occurs at the project site, the applicant shall repair the eroded areas with adequate protection to prevent further erosion.

BOARD OF DIRECTORS

Division I, NORMAN B. WALDNER, Dinuba • Division II, MASARU YOSHIMOTO, Fowler • Division III, GILDO NONINI, Fresno • Division IV, MARK McKEAN, Riverdale • Division V, BRENT GRAHAM, Hanford
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David R. Williams P.E.

Mr. Mike Patterson
September 29, 2010
Page 2

5. The applicant shall notify the Kings River Conservation District, 4886 East Jensen Avenue, Fresno, CA, phone (559) 237-5567, at least ten (10) days prior to commencement of work.

If you have any questions, please contact Keith Seligman, Manager of Flood Operations & Maintenance at (559) 237-5567 extension 120 or at (559) 217-4285. Please provide the District with a copy of any pertinent correspondence and any board action concerning this application.

Sincerely,



Steven P. Stadler P.E.
Chief Engineer

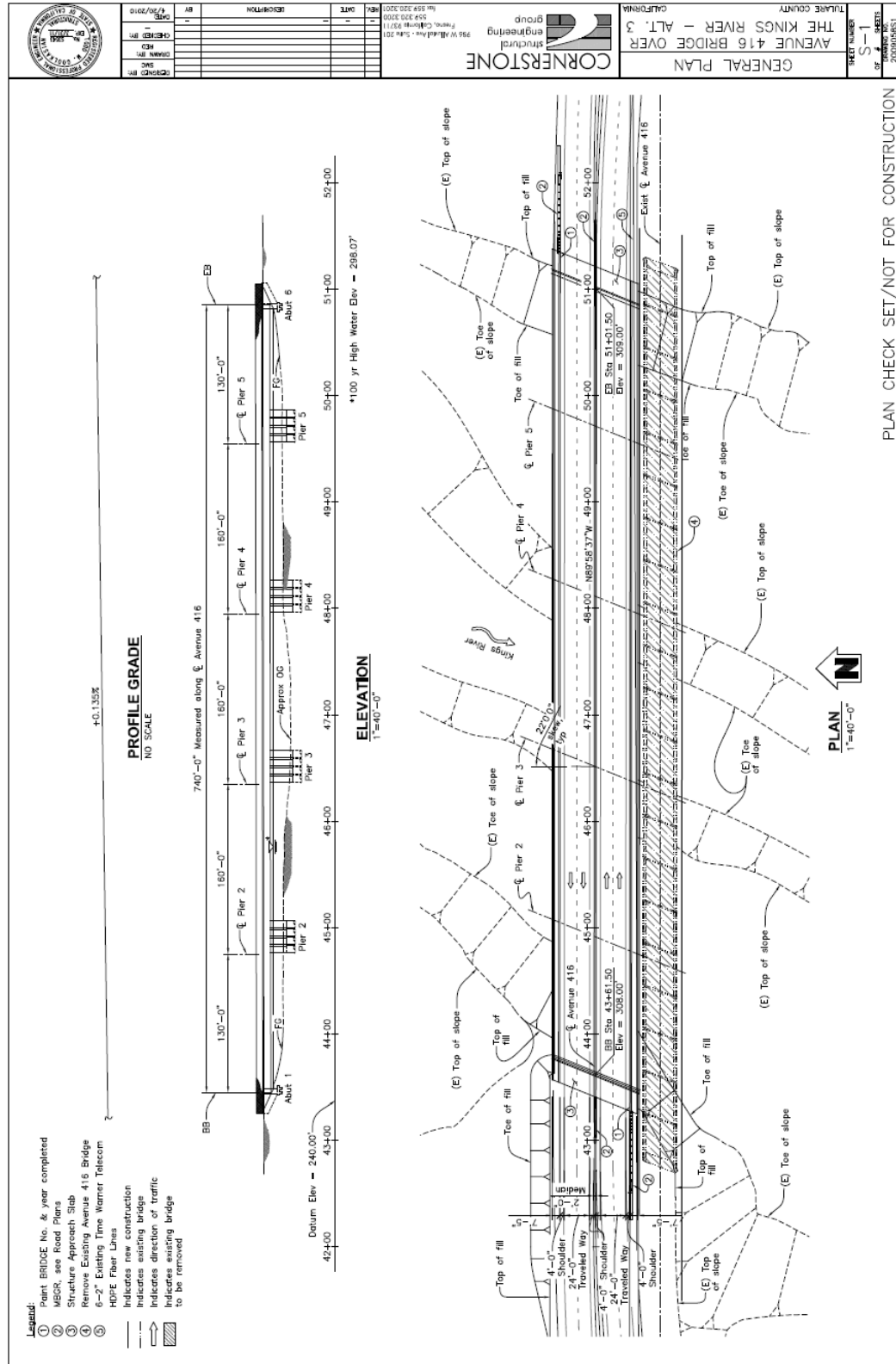
SS/KS/sjs

Enclosures: As Stated

L10-0184
File: 800.05.247

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APPENDIX A – GENERAL PLAN



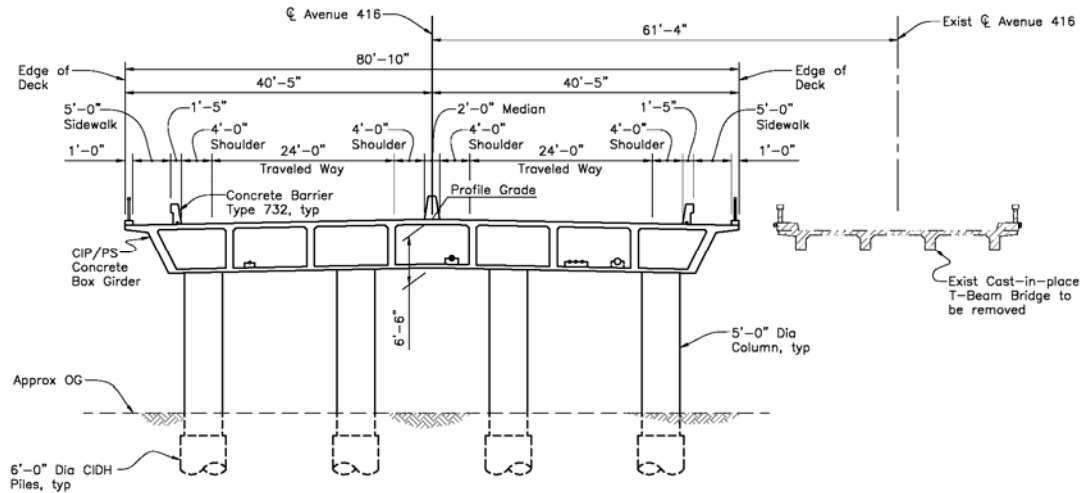
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Figure 26: Typical Section showing the bridge pier configuration

Abutment Design

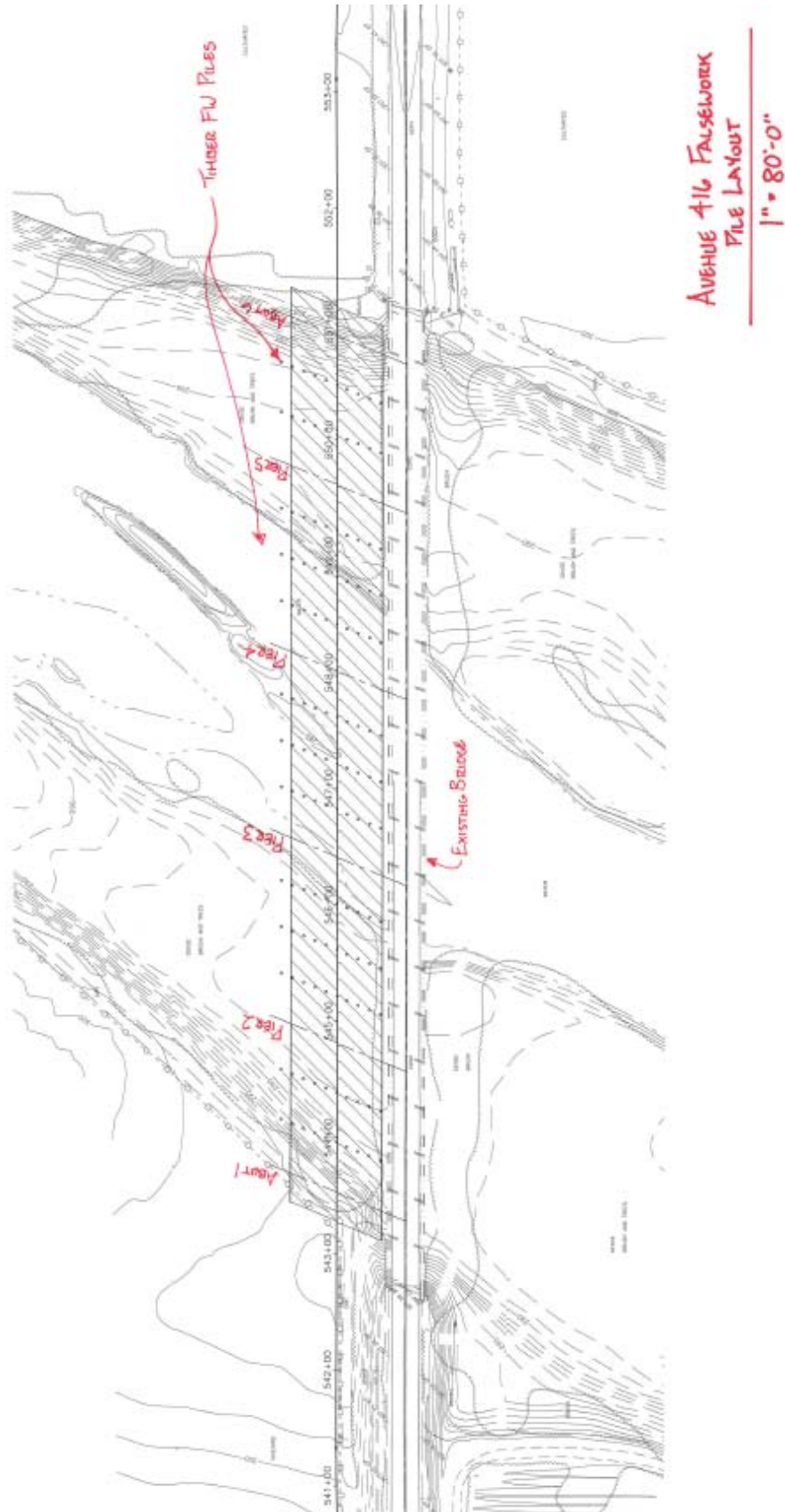
According to the Draft Preliminary Geotechnical Report, the soil at the abutments is composed of sandy silt with some interbeds of silty sand and poorly graded sand. The abutments should be checked assuming the roadway fills wash out to elevation 281 in conformance with Caltrans Bridge Design Specification 4.4.5.2. The geotechnical consultant (Parihk) should be consulted to determine if there is a geotechnical reason to assume that the river cannot move laterally, this recommendation could be reconsidered.

SCOUR BACKUP INFORMATION

Table 12: Pier Scour Input Data Assuming no Skew and 10-deg skew

Variable	Alternative 1	Alternative 2	Alternative 3
Pier Shape	round	round	round
Pier Width (ft) above ground	5	6	7
Hydraulic Depth upstream (ft):	15	15	15
Velocity Upstream (ft/s)	4	4	4
K1 Nose Shape	1	1	1
Pier Angle	0 and 10	0 and 10	0 and 10
Pier Length (ft)	6	6	6
K2 Angle Coef	1 and 1.4	1 and 1.4	1 and 1.4
K3 Bed Cond Coef	1.1	1.1	1.1
K4 Armouring Coef	1	1	1

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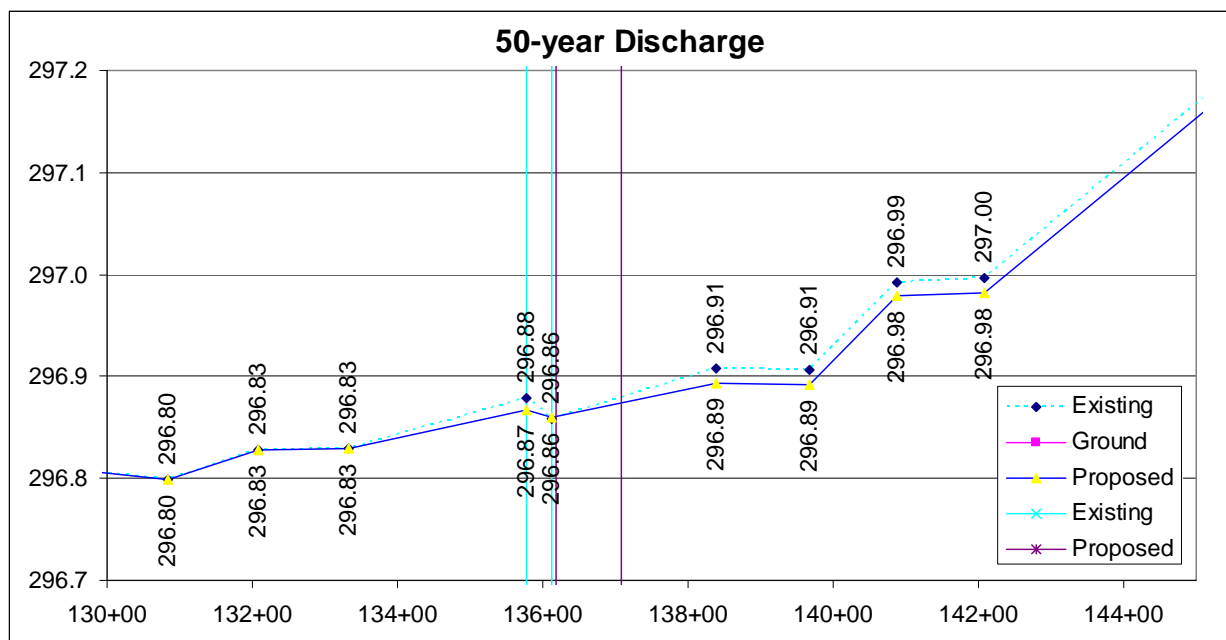


Figure 1: 50-year water surface elevation comparison existing vs. proposed

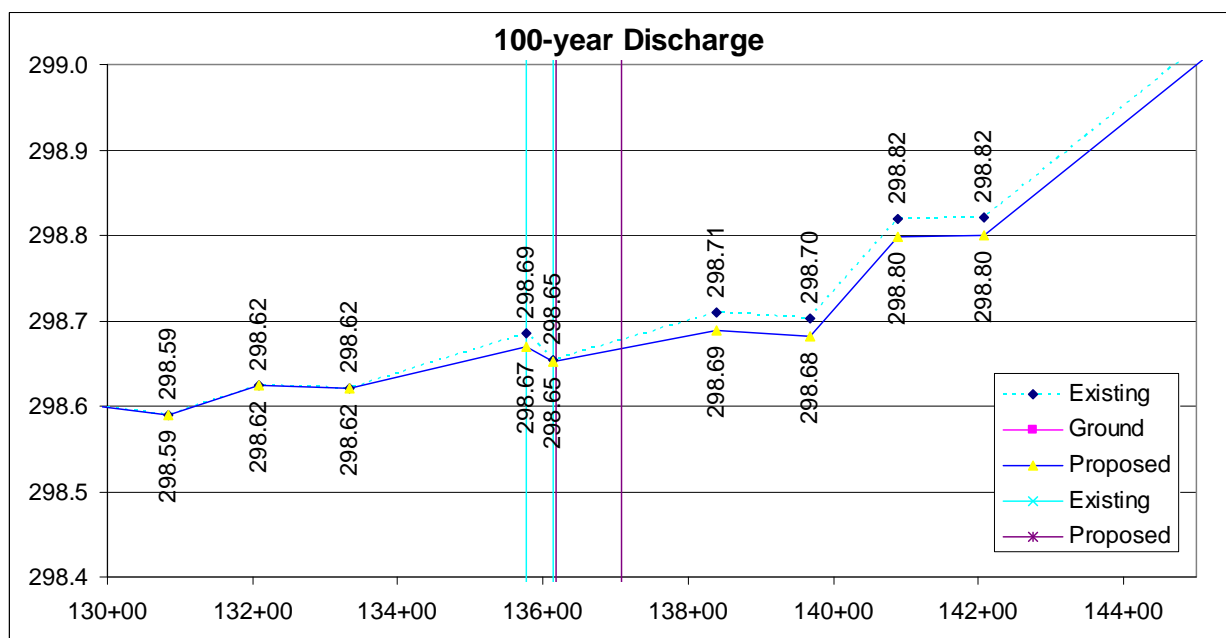
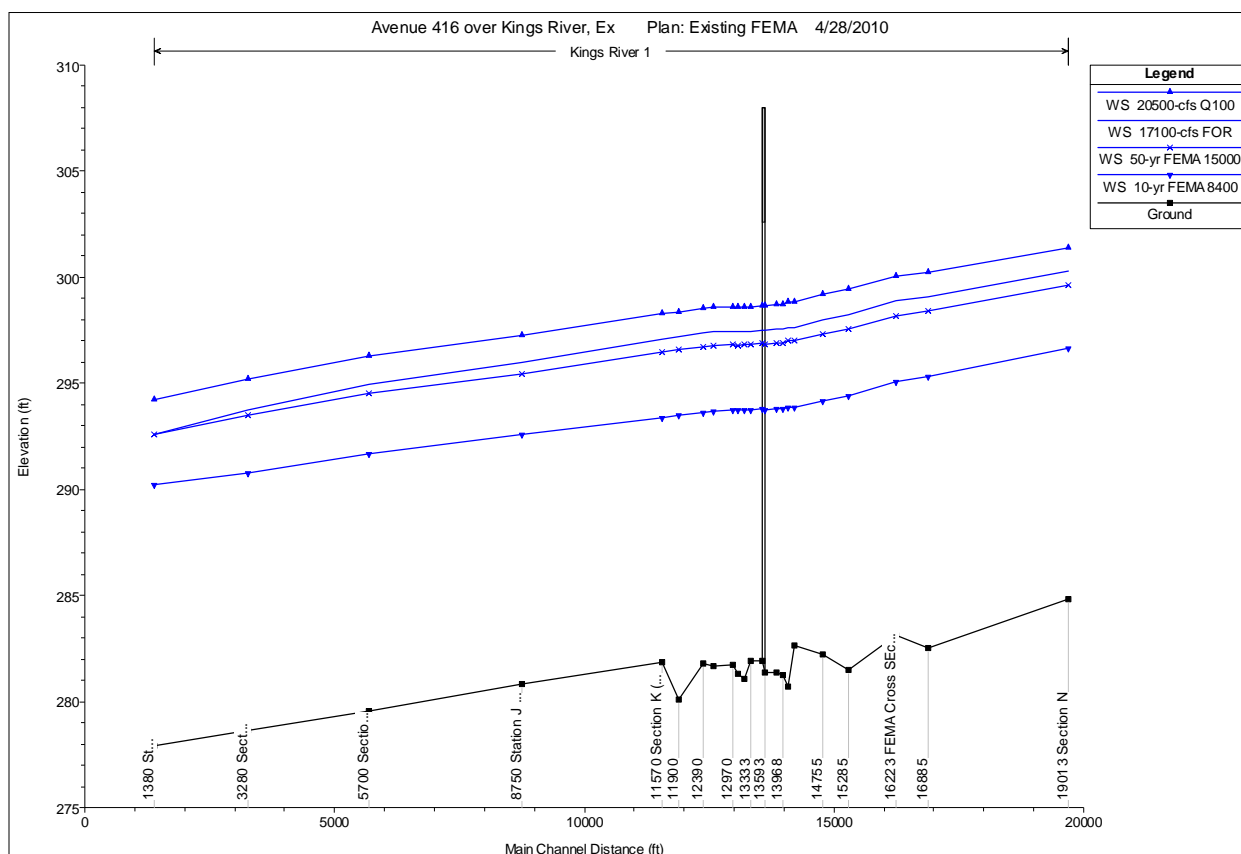


Figure 2: 100-year water surface elevation comparison existing vs. proposed

The proposed bridge will be a new bridge crossing at the Kings River constructed just upstream of the existing bridge. The bridge will improve the hydraulics slightly by replacing a bridge with 21 pier walls with a bridge with only 4 pile columns in the channel. In addition, the proposed minimum soffit elevation of 301.7 at Abutment 1 will provide 3 feet of freeboard above the 100-year water surface elevation of 298.7. Scour depths are shown in Table 2 below.

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elevation 301.4 while the Avila & Associates HEC-RAS model shows elevation 301.39 merging with the effective water-surface profile, to within +/- 0.5-feet at the upstream and downstream ends of the revised reach, in compliance with 44 CFR Part 65.6(a)(2). The Floodplain Evaluation Report was developed as part of the Environmental Impact Report for the bridge project (4).



No data was available to calibrate the model. The bridge maintenance records did not contain any highwater elevations nor was any additional calibration data found in our research into the bridge maintenance records.

Proposed Bridge Model

The HEC-RAS model was re-run with the proposed bridge. The only change to the proposed model was taking out the existing bridge and replacing it with the proposed bridge model. The proposed bridge will have significantly fewer piers than the existing bridge. Although 5-ft wide piers are anticipated in the bridge design, piers with 6-ft diameter were used in the modeling to provide a conservative approach if larger piers are ultimately chosen. As shown in Figure 16 and Figure 17 below, the proposed bridge was modeled with an encroachment on the left side making the bridge 706-ft long with the skew included.

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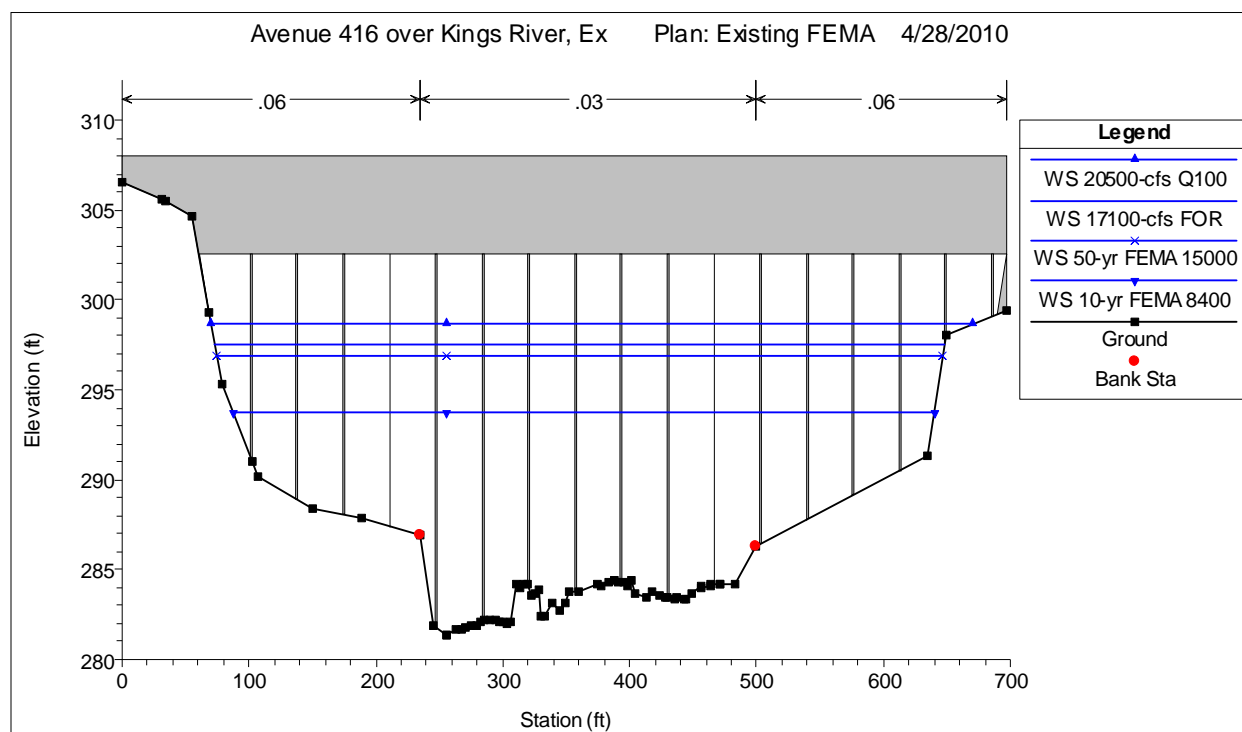


Figure 14: HEC-RAS cross section for the upstream existing conditions for the Flood of Record and 10- 50- 100- year Q 's

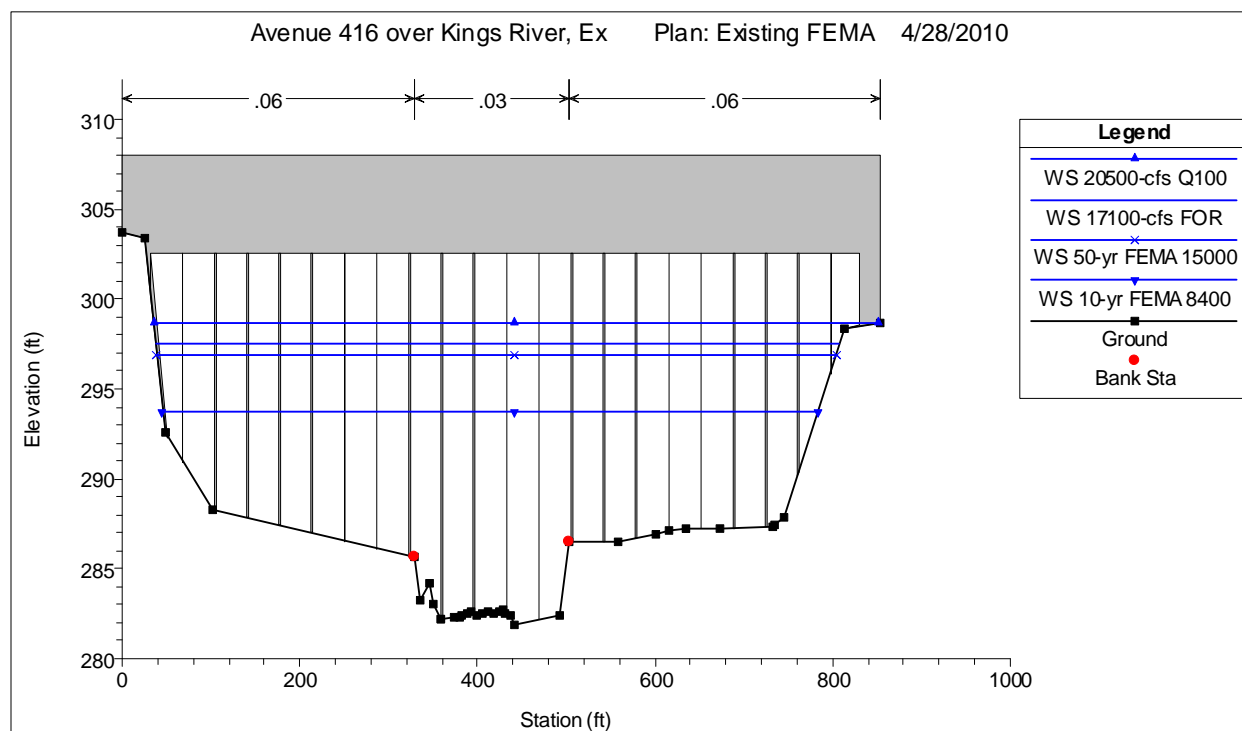


Figure 15: HEC-RAS cross section for the downstream existing conditions for the Flood of Record and 10- 50- 100- year Q 's

The FEMA model water surface elevation for the 10-, 50-, 100- and 500-year discharges were used as the downstream boundary condition. For the 100-year discharge, at the downstream end of the reach (station 1380), the water surface elevation is the same at elevation 294.2. At the upstream end of the Avila & Associates model using HEC-RAS, the upstream (Station 19013 or Section N), the FEMA reach is at

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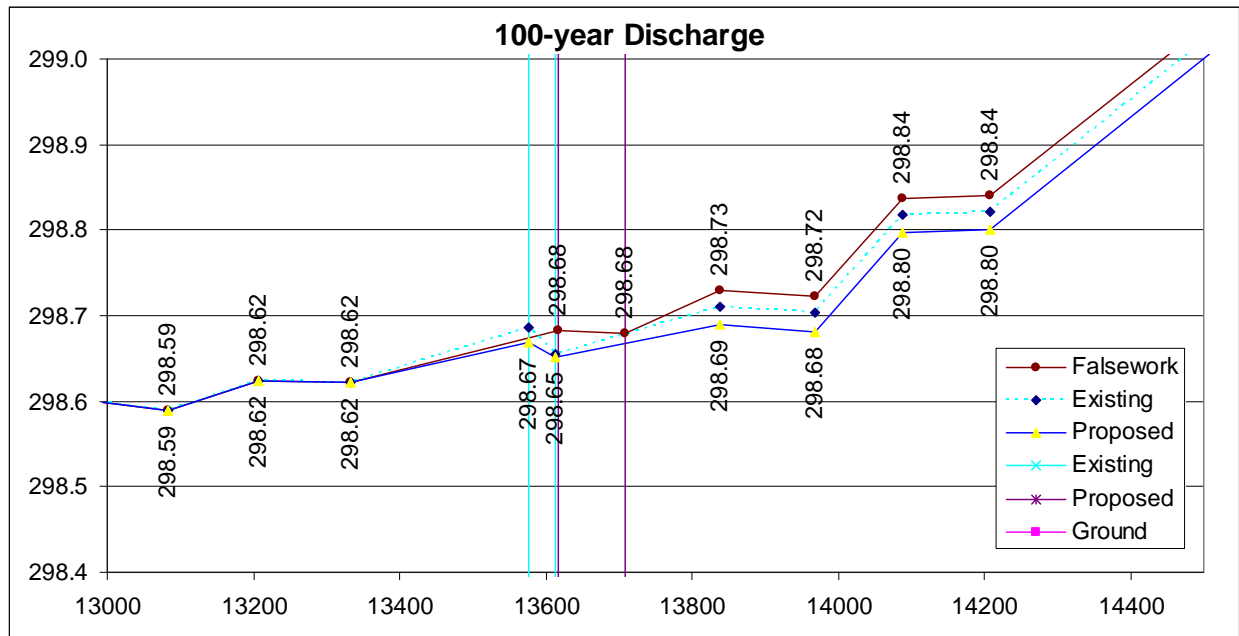


Figure 21: 100-year discharge water surface elevation with falsework and no debris

We also investigated the potential for debris capture on every pipe pile pier which would increase the pier width an assumed 3 times the pier width which is the debris criteria developed by the Santa Clara Valley Water District (SCVWD). This makes the 20-inch pipe piles an assumed 5-ft wide under these criteria. The proposed bridge piers would remain 6-ft wide as they tend to shed debris rather than capture it. The bridge is shown in Figure 22 below. There is a negligible change in water surface elevation between existing and with falsework + debris conditions (a maximum 0.06-foot or about 3/4 of an inch) and model results are shown in Figure 23 and Table 11 below:

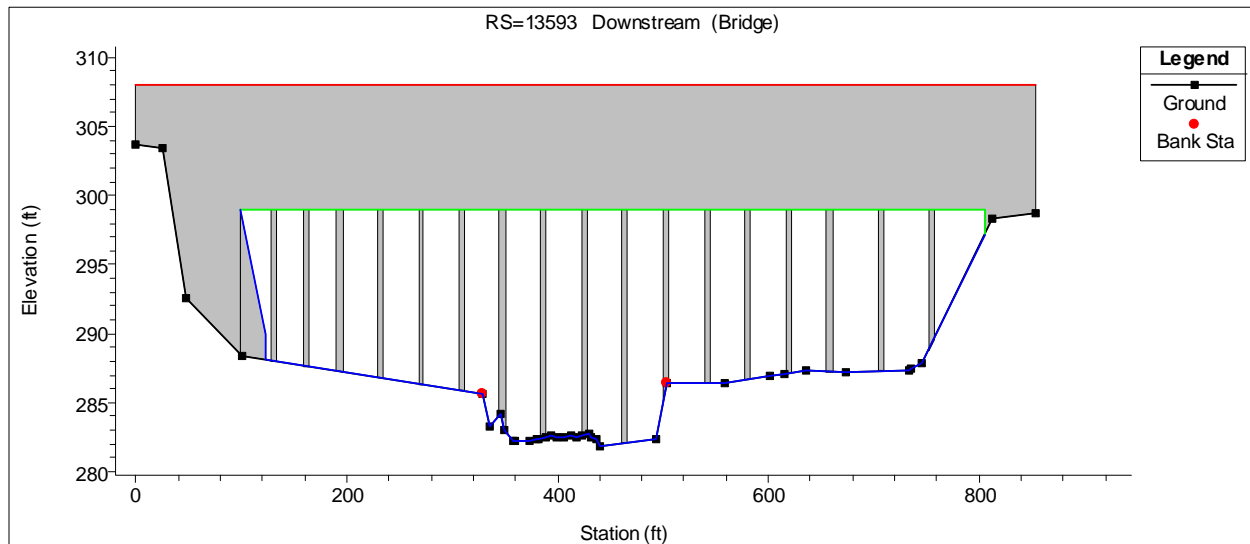
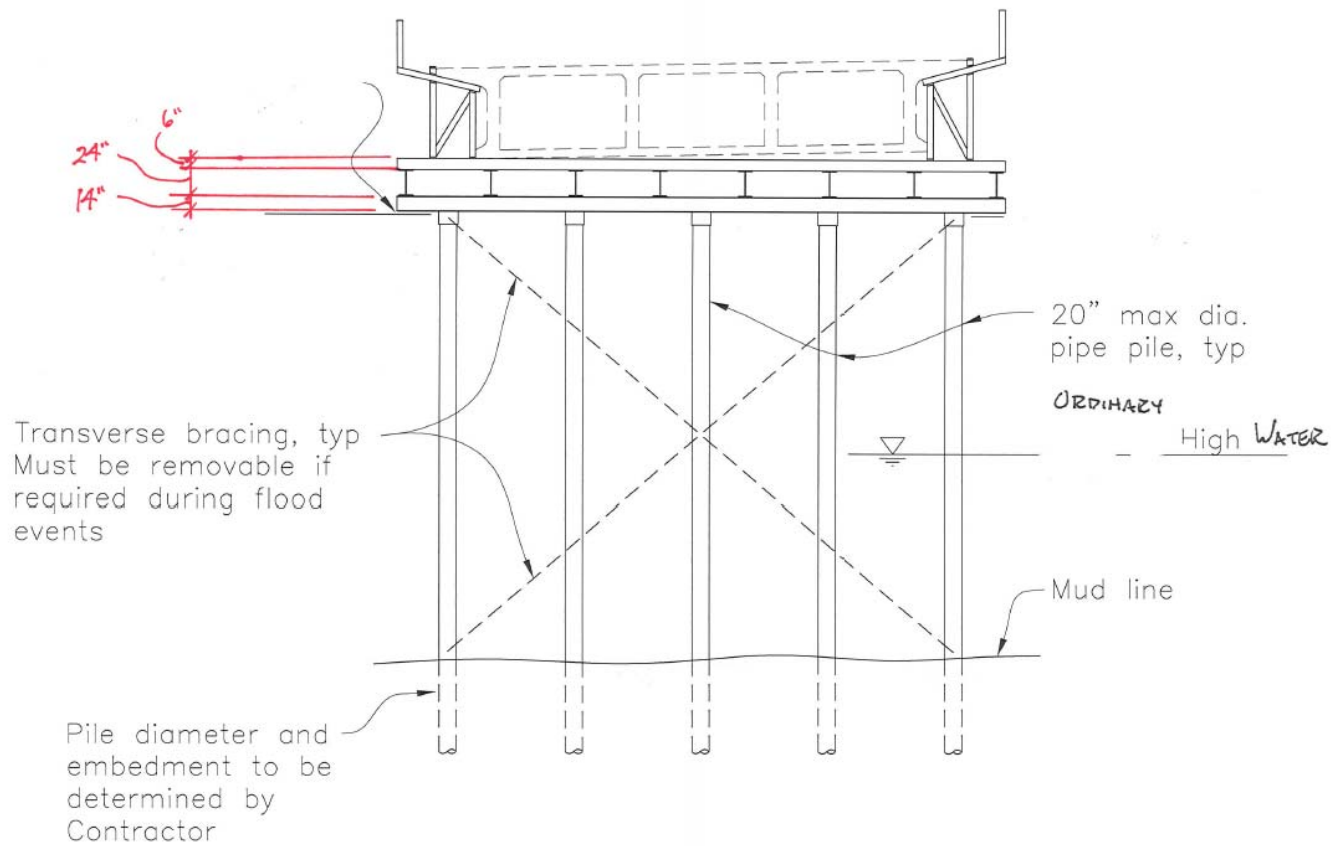


Figure 22: 5-ft wide falsework piers and 6-ft wide proposed bridge piers

DRAFT**APPENDIX E – FALSEWORK CONFIGURATION**

TYPICAL SECTION **TEMPORARY FALSEWORK**

$$\frac{3}{32}'' = 1' - 0''$$

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upstream (Station 19013 or Section N), the FEMA reach is at elevation 301.4 while the Avila & Associates HEC-RAS model shows elevation 301.38 merging with the effective water-surface profile, to within +/- 0.5-feet at the upstream and downstream ends of the revised reach, in compliance with 44 CFR Part 65.6(a)(2). The Floodplain Evaluation Report was developed as part of the Environmental Impact Report for the bridge project (4).

See Appendix C for detailed HEC-RAS Output and Appendix D for Graphical Overtopping Output.

TEMPORARY FALSEWORK ANALYSIS

Avila and Associates Consulting Engineers, Inc. (Avila and Associates) has completed its analysis of additional hydraulic scenarios with the falsework drawings from Cornerstone as shown in Appendix E. The falsework plan shows the 20-inch pipe piles at approximately 39-foot spacing (with skew) as shown in Figure 20 below. There is a negligible change in water surface elevation between existing and with falsework conditions (a maximum 0.02-feet or about 1/4th of an inch) as shown in Table 10 and Figure 21.

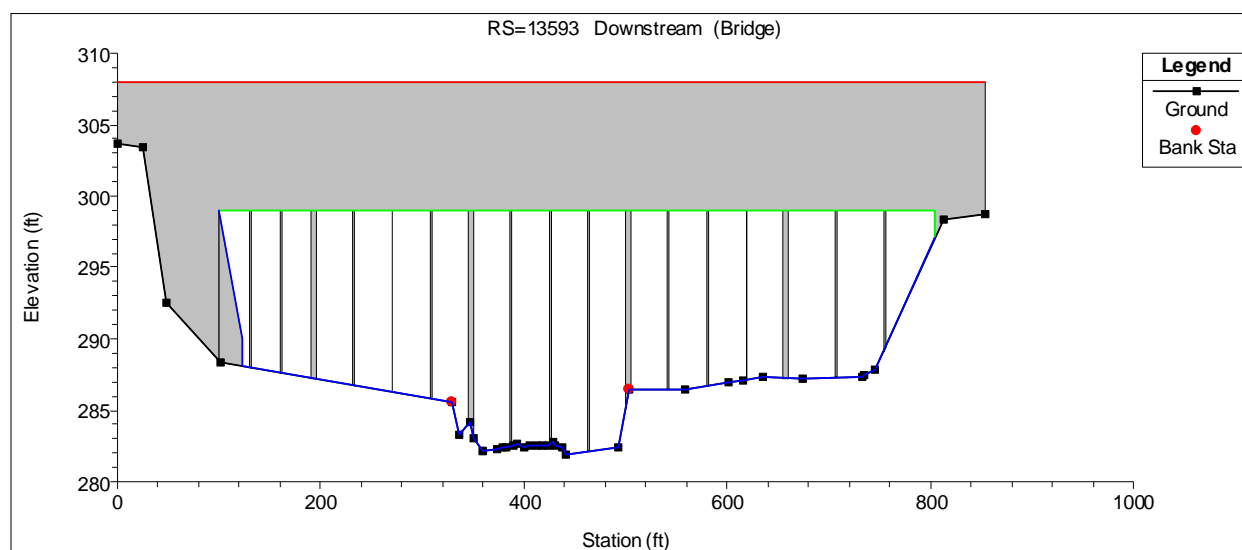


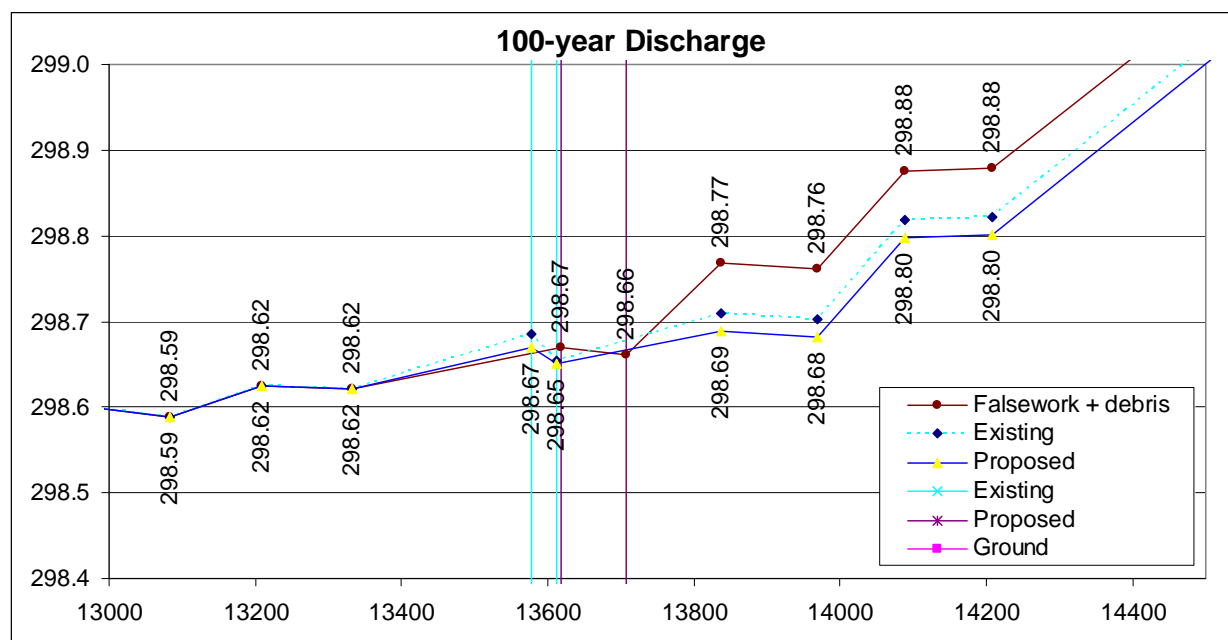
Figure 20: Falsework and proposed bridge piers

Table 10: Water surface elevation for the existing and proposed bridge for the 100-year discharge with falsework without debris

Station	Existing	Proposed	Difference
135+77	298.69	298.68	0.00
136+13	298.65	298.68	0.02
138+38	298.71	298.73	0.02
139+68	298.70	298.72	0.02
140+88	298.82	298.84	0.02
142+08	298.82	298.84	0.02
147+68	299.20	299.22	0.02
152+98	299.46	299.47	0.02
162+36	300.08	300.09	0.01
168+98	300.26	300.28	0.01
196+88	301.39	301.40	0.01

DRAFT*Table 11: Water surface elevation for the existing and proposed bridge for the 100-year discharge with falsework and debris*

Station	Existing	Proposed	Difference
135+77	298.6855	298.6696	-0.02
136+13	298.6544	298.6615	0.01
138+38	298.7103	298.7688	0.06
139+68	298.7027	298.7614	0.06
140+88	298.8185	298.8759	0.06
142+08	298.8213	298.8784	0.06
147+68	299.2021	299.2538	0.05
152+98	299.4585	299.5081	0.05
162+36	300.075	300.1151	0.04
168+98	300.2629	300.3003	0.04
196+88	301.3895	301.4131	0.02

*Figure 23: 100-year discharge water surface elevation with falsework and debris***HYDRAULIC CRITERIA**

Chapter 800 of the Caltrans Highway Design Manual (HDM) delineates the hydraulic design criteria for bridges (3). The basic HDM rule for hydraulic design is that bridges should be designed to pass the Q_{50} with sufficient freeboard and convey the Q_{100} without freeboard, exceptions may also be granted if sufficient evidence is provided. The HDM notes that 2 feet of freeboard is often assumed for preliminary bridge designs but leaves the recommendation for freeboard to the judgment of the hydraulic engineer based primarily upon the debris anticipated at the bridge.

The Central Valley Flood Protection Board (CVFPB), however, has jurisdiction over this river (California Code of Regulations Title 23, Division 1, Article 8, Section 128) and requires 3 feet of freeboard on the design discharge for major streams. Modification of this criterion will require coordination with the Central Valley Flood Protection Board.

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APPENDIX G – SCOUR CALCULATION BACKUP

Pier Scour Equation from HEC-18 (13)

$$\frac{y_s}{y_1} = 2.0 K_1 K_2 K_3 K_4 \left(\frac{a}{y_1} \right)^{0.65} Fr_1^{0.43}$$

where:

- y_s = Scour depth, m (ft)
- y_1 = Flow depth directly upstream of the pier, m (ft)
- K_1 = Correction factor for pier nose shape from Figure 6.3 and Table 6.1
- K_2 = Correction factor for angle of attack of flow from Table 6.2 or Equation 6.4
- K_3 = Correction factor for bed condition from Table 6.3
- K_4 = Correction factor for armoring by bed material size from Equation 6.5
- a = Pier width, m (ft)
- L = Length of pier, m (ft)
- Fr_1 = Froude Number directly upstream of the pier = $V_1/(gy_1)^{1/2}$
- V_1 = Mean velocity of flow directly upstream of the pier, m/s (ft/s)
- g = Acceleration of gravity (9.81 m/s²) (32.2 ft/s²)

Pier Scour Input Data and Results using CSU Equation

Input Data	Alternative 1	Alternative 2	Alternative 3
Pier Shape:	round	round	round
Pier Width (ft) (a):	5	6	7
Grain Size D50 ²⁶ (mm):	0.6	0.6	0.6
Hydraulic Depth Upstream (ft) (Area/Top Width) (y1):	15	15	15
Velocity Upstream (ft/s):	4	4	4
K1 Nose Shape:	1	1	1
Pier Angle:	0	0	0
Pier Length (ft):	6	6	6
K2 Angle Coef:	1	1	1
K3 Bed Cond Coef:	1.1	1.1	1.1
Grain Size D95 (mm):	1.5	1.5	1.5
K4 Armouring Coef:	1	1	1
Results			
Scour Depth Ys (ft):	7.8	8.8	9.8
Froude#:	0.18	0.18	0.18

²⁶ D50 and D95 taken from Preliminary Geotechnical Report grain size distribution (11)